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## THAT WHICH IS CLAIMED IS:

1. A multimode wavelength division multiplexing (WDM) network transceiver comprising: a plurality of optical transmitters transmitting optical communications signals along

respective\signal paths;

a multiplexer operatively connected to each optical transmitter for receiving the optical communications signals and multiplexing the optical communications signals into a multimode wavelength division multiplexed optical communications signal having a wavelength channel spacing less than about 1,000 gigahertz;

a demultiplexer for receiving a multimode wavelength division multiplexed optical communications signal and demultiplexing the signal into a plurality of demultiplexed optical communications signals; and

a plurality of optical receivers each matched with a respective optical transmitter for receiving and detecting the demultiplexed optical communications signal.

- 2. A network transceiver according to Claim 1, wherein said optical receiver comprises a PIN detector.
- 3. A network transceiver according to Claim 2, wherein said PIN detector comprises an InGaAS PIN detector.
- 4. A network transceiver according to Claim 2, wherein said optical receiver further comprises a transimpedance amplifier.

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- 5. A network transceiver according to Claim 1, wherein said optical receiver comprises an Avalanche Photo Diode (APD).
- 6. \ A network transceiver according to Claim 4, wherein said APD comprises an InGaAS APD detector.
- 7. A network transceiver according to Claim 1, wherein said optical transmitter comprises a distributed feedback laser.
- 8. A network transceiver according to Claim 7, wherein said optical transmitter comprises a thermoelectric cooler and controller circuit.
- 9. A network transceiver according to Claim 1, and further comprising an attenuator positioned within a transmit signal channel between each optical transmitter and said multiplexer.
- 10. A network transceiver according to
  Claim 9, and further comprising a single mode optical
  fiber defining a signal channel between said attenuator
  and said optical transmitter and an optical fiber
  defining signal channel between said attenuator and
  said multiplexer.
- 11. A network transceiver according to
  Claim 1, and further comprising a transceiver
  electrically connected to each optical transmitter and
  matched optical receiver for receiving and transmitting
  an optical communications signal, wherein said
  transceiver is operative at a first wavelength band and

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said optical transmitter and matched optical receiver are operative at a second wavelength band.

- 12. A network transceiver according to Claim 11, wherein said second wavelength band is upconverted from said first wavelength band.
- 13. A network transceiver according to Claim 1, and further comprising a physical sublayer chip circuit operatively connected to a plurality of optical transmitters and matched optical receivers.
- 14. A network transceiver according to Claim 13, and further comprising an electrical interface operatively connected to said physical sublayer chip circuit.
- 15. A network transceiver according to Claim 14, wherein said electrical interface comprises a plurality of RJ-45 jacks for Ethernet 1000 Base-T connection.
- 16. A network transceiver according to Claim 1, and further comprising a serial/deserializer (SERDES) circuit operatively connected to an optical transmitter and matched optical receiver, a switch circuit operatively connected to said serial/deserializer circuit, and a physical sublayer chip circuit and electrical interface operatively connected to said switch circuit.
  - 17. A network transceiver for processing optical communications signals into a wavelength division multiplexed optical communications signal comprising:

a plurality of transceivers for receiving and transmitting optical communications signals contained at a first wavelength band and processing the optical communications signals as electrical signals;

an optical transmitter operatively connected to each transceiver for receiving the electrical signals from the transceiver and transmitting an optical communications signal at a second wavelength band;

a wavelength division multiplexer operatively connected to the optical transmitters for wavelength division multiplexing the optical communications signals within the second wavelength band onto a multimode fiber output;

a demultiplexer for receiving wavelength

20 division multiplexed optical signals within the second

wavelength band and demultiplexing the optical

communications signals into demultiplexed optical

communications signals; and

an optical receiver operatively connected to

25 the demultiplexer and each respective transceiver for
receiving and detecting a demultiplexed optical
communications signal and generating a signal to a
respective transceiver to be output as an optical
communications signal contained within the first

30 wavelength band.

- 18. A network transceiver according to Claim 17, wherein said optical receiver comprises a PIN detector.
- 19. A network transceiver according to Claim 18, wherein said PIN detector comprises an InGaAS PIN detector.

- 20. A network transceiver according to Claim 18, wherein said optical receiver further comprises a transimpedance amplifier.
- 21. A network transceiver according to Claim 17, wherein said optical receiver comprises an Avalanche Photo Diode (APD).
- 22. A network transceiver according to Claim 21, wherein said APD comprises an InGaAS APD detector.
- 23. A network transceiver according to Claim 17, wherein said optical transmitter comprises a distributed feedback laser.
- 24. A network transceiver according to Claim 17, wherein said optical transmitter comprises a thermoelectric cooler and controller circuit.
- 25. An network transceiver according to Claim 17, wherein each transmitter is operative for transmitting the optical communications signal contained within a second wavelength band onto a single 5 mode fiber output.
- 26. A network transceiver according to Claim 17, and further comprising a single mode optical fiber defining a signal channel between said attenuator and said optical transmitter and an optical fiber defining a signal channel between said attenuator and said wavelength division multiplexer.

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A network transceiver according to 27. Claim 17, wherein said second wavelength band is upconverted from said first wavelength band.

28\ A network transceiver according to Claim 17, wherein a wavelength channel spacing is less than about 1,000 gigahertz.

29. A multiport network hub comprising: a plurality of transceiver boards, each having a network interface for connection to a network, 5 a switch circuit operatively connected to the network interface, at least one optical transmitter for receiving signals from a network via the network interface and transmitting optical communications signals, at least one  $\phi$ ptical receiver matched with the at least one optical transmitter for receiving and detecting an optical communications signal and generating a signal to the network via the network interface, and a processor operatively connected to said switch circuit for controlling same;

a bus interconnecting each processor;

a wavelength division multiplexer operatively connected to each optical transmitter for multiplexing the optical communications signals into a multimode wavelength division multiplexed\optical communications signal; and

a demultiplexer operatively connected to each optical receiver for receiving and demultiplexing multimode wavelength division multiplexed optical communications signal into a plurality of demultiplexed optical communications signals.

- , 30. A multiport network hub according to Claim 29, wherein said optical receiver comprises a PIN detector.
- 31. A multiport network hub according to Claim 30, wherein said PIN detector comprises an InGaAS PIN detector.
- 32. A multiport network hub according to Claim 29, wherein said optical receiver comprises an Avalanche Photo Diode (APD).
- 33. A multiport network hub according to Claim 32, wherein said APD comprises an InGaAS detector.
- 34. A multiport network hub according to Claim 30, wherein said optical receiver further comprises a transimpedance amplifier.
- 35. A multiport network hub according to Claim 29, wherein said optical transmitter comprises a distributed feedback laser.
- 36. A multiport network hub according to Claim 29, wherein said optical transmitter comprises a thermoelectric cooler and controller circuit.
- 37. A multiport network hub according to Claim 29, wherein said network interface is operative with an Ethernet infrastructure.
- 38. A multiport network hub according to Claim 37, wherein said network interface comprises a plurality of RJ-45 jacks.

- 39. A multiport network hub according to Claim 29, and further comprising a serial/deserializer (SERDES) interface circuit operatively connected between each of an optical transmitter and matched optical receiver and the switch circuit.
  - 40. A multiport network hub according to Claim 29, wherein said network interface further comprises octal physical sublayer chip circuits.
  - 41. A multiport network hub according to Claim 29, wherein a channel spacing is less than about 1,000 gigahertz.
  - A2. A method of expanding the bandwidth of an existing optical communications network comprising the steps of:

transmitting optical communications signals

from a plurality of optical transmitters positioned
along respective signal channels;

multiplexing the optical communications signals into a multimode wavelength division multiplexed optical communications signal having a channel spacing less than about 1,000 gigzhertz;

demultiplexing a multimode wavelength division multiplexed optical communications signal within a demultiplexer into a plurality of optical communications signals along respective signal thannels; and

receiving and detecting the plurality of optical communications signals within optical receivers that are respectively matched with optical transmitters.

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- \ 43. A method according to Claim 42, wherein the step of detecting is within a PIN detector.
- 44. A method according to Claim 43, wherein the PIN detector comprises an InGaAS detector.
- 45. A method according to Claim 42, wherein the step of transmitting comprises the step of generating an optical communications signal with a distributed feedback laser.